BioTector Venturi Driven Vacuum Sampler

BioTector
ANALYTICAL SYSTEMS LIMITED

USER MANUAL
BioTector Venturi Sampler
For connection to BioTector TOC Analyzers.

M3 system with PLC keyboard controls.
Software Venturi Sampler 1-6-stream V5.03
Standard Venturi Sampler

Original instructions

Read the instructions in this manual carefully before installing or starting the Venturi Liquid Sampler for the BioTector TOC analyzer.

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Product names mentioned herein are for identification purposes only and may be trademarks or registered trademarks of their respective companies.

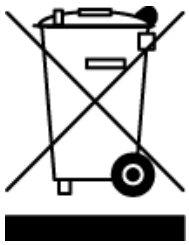
Where manuals are translated into several languages, the source language text is considered as the original.

Maintenance, operation and/or commissioning should not be carried out unless personnel have been fully trained in the operation of the Venturi Sampler.

Prior to working on the inside of the sampler, the technician should be grounded via an earth strap.

The Venturi Sampler uses pressurized air and water.

Precautionary Labels Attached to the Instrument

	Electrical equipment marked with this symbol may not be disposed of in European domestic or public disposal systems. Return old or end-of-life equipment to the manufacturer for disposal at no charge to the user.

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1. Photograph of typical Venturi Sampler

The Venturi Sampler with main components labelled.

2. Venturi Sampler

The Venturi Sampler has 2 possible build options, depending on its construction.

Build Option 1:

The Venturi Sampler can be designed to collect a pressurized sample liquid, reduce the pressure of this liquid sample to ambient pressure, and supply this sample to the BioTector.

The Venturi Sampler also returns the spent sample back to the pressurised sample point.

Build Option 2:

The Venturi Sampler can be designed to collect a sample of liquid at ambient pressure, from a depth of up to 7 meters (measured from the bottom of the sampler to the lowest liquid level in the sump, at sea level), and supply this sample to the BioTector at ambient pressure. The vacuum used in the sampler is generated with a Venturi pump.

The sampler also returns the spent sample back to the sample point.

Sensor Options:

The Venturi Sampler will have been supplied with one of the sensor options below:

1. Two capacitive level / liquid sensors supplied to detect the sample.
2. One ultrasonic level / liquid sensors supplied to detect the sample.

Systems built with an Ultrasonic sensor, the sensor is enabled on the PLC. Below table shows the example block settings of a Venturi Sampler with enabled and disabled Ultrasonic Sensor.

Block No.	Block Description	Value
B231	Ultrasonic Sensor Enable	0 = Disabled 1 = Enabled

Utilities

Feed Air requirement: typically 6 bars, 50 LPM when venturi is running.
Purge air requirement, typically 100 LPM at 3.5 bars.
Air must be water, oil and dust free (-20°C dew point).

Wash water requirement: 3 bar with customer supplied regulator fitted.
Usage typical 10 liters per hour.
Water can be heated up to 90C if required for hot water backwash.

Note, blowback pressure for water and air must be 1.5 times the sample pressure.

For additional details, please see BioTector Venturi Sampler Technical Specifications.

3. Technical Specifications

BioTector Venturi Sampler Technical Specifications

TYPICAL TECHNICAL DATA

PLC Enclosure:	Polystyrene with glazed polycarbonate door
Dimensions (HxWxD):	2010mm x 390mm x 160mm
Weight:	20 kg – 30 kg
Noise level:	50-70 dB(A) during filling and purging with short term noise 1 to 2 seconds in duration up to 90 dB(A) when pneumatic valves are de-energized.
Power Consumption:	24 W (1 Amp 24V DC)
Control Wire Specification:	Number of Cores = 6 cores, Current Rating minimum = 3 Amp, CSA (Cross Sectional Area minimum) = 0.5mm^2.

FEATURES IN DETAIL

Operation:	PLC with Keyboard Automatic no sample fill fault indication Direct control from the BioTector through the 6 core cable Sample chamber and sample line purge with air and water
Language Options:	English (Other languages are available upon request.)

OPTIONAL FEATURES

Multi-stream:	Valves for up to 6 streams

CONSUMABLES

Instrument Air:	6 bars (50 liters/minute flow rate when venturi pump is running at 6bar) (~100 liters/minute flow rate when venturi sampler is purging at 3.5bar) Note: If using a standalone compressor please ensure it can continually supply the above requirements, this may require up to 100% duty cycle.
Air Quality:	-20°C dew point (free of water, oil and dust)
Water:	3 bars (~10 liters per hour at 3 bars) Water can be heated up to 90°C for hot water backwash Water regulator and/or water heater to be supplied by the user
Service:	Typical 6 Monthly Intervals

SYSTEM PARAMETERS

Sample Chamber:	PFA
Sample Volume:	70ml available to BioTector
Fittings and Valves:	SS-316, EPDM, PTFE
Venturi Pump:	SS-316
Sampler Sample Tubing:	PFA (1/2” OD x 3/8” ID)
Cycle Time:	Controlled by BioTector

SAMPLE & ENVIRONMENTAL CONDITIONS

Venturi Vacuum:	900 mbar (maximum)
Sample Lift:	7 meters (maximum, at sea level) (Measured from the bottom of the sampler to the lowest liquid level)
Sample Transport:	See detailed data on the next page. Note data refers to sample transport times at sea level
Sample Fill Time:	See detailed data on the next page. Note data refers to sample transport times at sea level
Sample Inlet Pressure:	Ambient (for applications with high sample pressures up to 4 bars, alternative systems are available) Pressure for air and water must be at least 1.5 times greater than the sample inlet pressure.
Drain Pressure:	Ambient (for applications with high drain pressure, alternative systems are available)
Sample Inlet Temperature:	2°C – 90°C (36°F - 194°F)
Sample Particle Size:	Up to 2 mm, soft particulates
Ambient Temperature:	5°C – 40°C
Humidity:	5% - 85%, non-condensing

4. Typical Operational Data

Build parameters.
First chamber volume: 70ml.
Second chamber volume: 270ml.
Sample tubing: ½" OD x 3/8" ID.

Sample distance, 40 meters, typical filling and purging times

Lift, meters	Time for venturi sampler to fill tubes and chamber	Venturi filling time, including pre-purge times for 4 streams. Add 8s for 6 streams.	Purge time	Typical overall time, including time for the BioTector to inject the sample and flush its lines.
0	40s	76s	90s	324s, 5m24s
2	49s	85s	90s	336s, 5m36s
4	59s	95s	90s	348s, 5m48s
6	83s	119s	90s	378s, 6m18s
7	122s	158s	90s	427s, 7m07s

Sample distance, 80 meters, typical filling and purging times.

Lift, meters	Time for venturi sampler to fill tubes and chamber	Venturi filling time, including pre-purge times for 4 streams. Add 8s for 6 streams.	Purge time	Typical overall time, including time for the BioTector to inject the sample and flush its lines.
0	124s	160s	120s	459s, 7m39s
2	145s	181s	120s	486s, 8m06s
4	179s	215s	120s	528s, 8m48s
6	255s	291s	120s	624s, 10m24s
7	345s	381s	120s	735s, 12m15s

Notes:

- The typical overall times above are also the minimum BioTector cycle time.
- It is essential that the tube slopes gently back to the sample point, dips and rises in the sample tube increases the sample transport time.
- Any point of the sample tube must never be higher than 7 meters above the sample point.

5. Manual Operation:

To manually fill the sampler, press the [A] key on the PLC for > 2 seconds. The PLC latches this input, and this simulates the operation of the BioTectors SAMPLER FILL command.

To manually empty and purge the sampler, press the [B] key on the PLC for > 2 seconds. The PLC latches this input, and this simulates the operation of the BioTectors SAMPLER EMPTY command.

To reset the sampler at any time, press the [ESC] key.

6. Typical Operational sequences, Fill.

Operation: Fill	**Default duration (note that all times are approximate, and will vary with the specific application)**	**Sampler action**
Note: If the air used for pressurizing the sampler is below its set point at any time, the samplers fault output is activated.		
BioTector gives fill command or [A] key on the PLC is held down for > 2 seconds.	1-2 seconds	No action taken for 1 second.
Purge stream valves with air	4 times 4 seconds (*6 times 4 seconds for 6 stream option)*	Open each stream inlet valve (if fitted) for 4 seconds. Close the valve to the venturi. Open the purge air valve. Purge the stream valve with instrument air.
Purge sample chamber and line with air.	20 seconds	Open the selected stream inlet valve. Close the valve to the venturi. Open the purge air valve. Purge the sample line with instrument air.
Fill External Chamber*	0 seconds	Open the selected stream inlet valve. Open the venturi air valve. Allow the External chamber to fill.
Settling Time*	0 seconds	No action
*Note: If a particulate separation chamber “External Chamber” option is being used at the sampling point externally, Fill External Chamber & Settling Time timers will need to be adjusted according to the site specific requirements.		
Fill the sampler	100 seconds	Open the selected stream inlet valve. Open the venturi air valve. Allow the sampler to fill.
Sampler full	N/A	Close the selected stream inlet valve. Deactivate the venturi pump. There is also a timer which times out even if the sampler is not full. After the timer has timed out: Open the valve to the BioTector. If the sampler is not full when the timer times out, an error is generated.
Note: The sampler remains in the Sampler Full condition, until reset by an empty command from the BioTector, or the [B] key on the PLC is held down for >2 seconds.		

7. Fill Timer Blocks in the Venturi Sampler PLC.

Block No.	Block Description	Default Value	Unit
B106	Timers used to control the purge sequence for up to 4 or 6 optional stream valves, for 4 and 6 stream venturi sampler option.	ON: 40 OFF: 1	ms
B126		161 / 241	ms
B147		16 / 24	s
B148	Purge chamber and line prior to filling timer.	20	s
Note: Some applications may have a certain size particulate separation chamber “External Chamber” option which gathers and settles the sample at the sampling point prior to the Venturi Sampler is filled with the sample. In applications where this chamber is present, B170 & B172 are changed from the default zero second value to the site specific values.			
B170	External chamber fill time.	0	s
B172	External chamber settling time.	0	s
B155	This block serves two purposes: 1. There are liquid sensors to stop the Venturi fill sequence once sample is detected. If no sample is detected within the duration of this block the fill sequence is automatically stopped and a fill error activated, this could be due to dry stream etc. The BioTector Sample valve opens once this timer elapses also. To account for variations in the stream the duration of this block should be longer (~40%) than the typical time taken for the sensors to detect sample once the ‘Filling Sampler’ message appears on the PLC Display. 2. If the sample is successfully detected during this timer the sample is allowed to settle while the timer elapses. If the site conditions require some settling of the sample prior to sampling by the BioTector then this timer can be extended to accommodate this need.	100	s

Default FILL SEQUENCE TIME 4 Stream	136	s
Default FILL SEQUENCE TIME 6 Stream	144	s
Note: B126 not included in calculation of FILL SEQUENCE TIME		

The SAMPLER time in the BioTectors SAMPLE PUMP menu must be greater than FILL SEQUENCE TIME of the Venturi Sampler. The FILL SEQUENCE TIME in seconds can be found by pressing the [+] key on the PLC while in Standby Mode. This will automatically adjust if times are changed from default settings to show the new FILL SEQUENCE TIME.

In the default configuration the fill sequence of the Venturi sampler takes 136 seconds, this allows 100s for the Venturi sampler to fill its tubes and chamber, (the other ~40 seconds being used for the initial purge of the Venturi sampler). This configuration is suitable for sites with a 40m sample line and a lift up to approximately 5 to 6 meters. Longer sample lines will require the default time in both the Venturi samplers PLC and BioTector Sampler setting to be changed.

8. Typical Operational sequences, Purge.

Operation: Purge	Default duration (note that all times are approximate, and will vary with the specific application)	Sampler action
Note: If the air used for pressurizing the sampler is below its set point at any time, the samplers fault output is activated.		
BioTector gives sample pump reverse run command.	N//A	Open the valve to the BioTector. The BioTectors sample pump runs in reverse. The sample and reverse cleaning acid are pumped back into the sampler.
BioTector gives empty command, or [B] key on the PLC is held down for > 2 seconds.	5 seconds	Close the valve to the BioTector.
Purge sample chamber and line with air.	10 seconds	Open the inlet valve. Close the valve to the Venturi. Open the purge air valve. Purge the sample line with instrument air.
Purge sample chamber and line with air and water.	5 seconds	Open the inlet valve. Close the valve to the Venturi. Open the purge air valve. Open the water valve. Purge the sample line with instrument air and water.
Purge the sample chamber and line with water.	40 seconds	Open the inlet valve. Close the valve to the Venturi. Open the water valve. Purge the sample line with water.
Purge the Venturi, sample chamber and line with air and water.	5 seconds	Open the inlet valve. Open the purge air valve. Open the water valve*, but only if the counter has reached its set-point.* Open the Venturi air valve. Purge the Venturi, sample chamber and line with air and water.
Purge the Venturi, sample chamber and line with air.	10 seconds	Open the inlet valve. Open the purge air valve. Purge the Venturi, sample chamber and line with air.
Purge sample chamber and line with air.	90 seconds	Open the inlet valve. Close the valve to the Venturi. Open the purge air valve. Purge the sample line with instrument air.
Standby.	N/A	Close the inlet valve. Open the drain valve.

9. Empty Timer Blocks in the Venturi Sampler PLC.

Block No.	Block Description	Default Value	Unit
B158	Wait until BioTector valve closes.	5	s
B161	Purge sampler with air.	10	s
B162	Purge sampler with air and water.	5	s
B167	Purge sampler with water.	40	s
B184	Purge Venturi and sampler with air and water.	5	s
B185	Purge Venturi and sample with air.	10	s
B186	Purge sampler / sample line with air.	90	s
	Default SAMPLER EMPTY TIME 4 Stream	165	s
	Default SAMPLER EMPTY TIME 6 Stream	195	s

The SAMPLER EMPTY TIME in seconds can be found by pressing the [-] key on the PLC while in Standby Mode. This will automatically adjust if times are changed from default settings to show the new SAMPLER EMPTY TIME.

It is important to note that the:

$$FILL\ SEQUENCE\ \ TIME\ +\ \text{SAMPLER EMPTY TIME}\ \text{ must be less than the BioTector Reaction Time}$$

This is not an issue for default settings but for applications with long sample lines or large sample lifts this time may exceed the BioTector Reaction Time and a REACTION DELAY will need to be added to the BioTector.

10. Venturi Water Purge.

A counter (B133) is part of the software so that the Venturi does not have to be purged with water each purge cycle. The default is 2 (i.e. purge with water every second cycle) but this can be changed if required.

Block No.	Block Description	Default Value
B133	Water Wash Counter	2

11. Fault conditions.

To reset the fault on the sampler, press the [ESC] membrane keyboard switch on the sampler for >1 second.

Possible fault conditions:

1. Low purge instrument air pressure – check air pressure.
2. Sampler does not fill on time – check sample, Venturi and / or valves.
3. Sampler shows full when it is not full – confirm that the chamber next to the liquid detection sensors is clean and dry.

12. Programming the BioTector for use with the Venturi Sampler.

Programming the BioTector to use a sampler is carried out in the Sample Pump menu.
First, ensure that the sampler has been selected in the system Configuration / System Setup menu.

Time for the fill command
In the Sample Pump menu, set the time for the sampler. This is typically 137s (FILL SEQUENCE TIME + 1 second) *(145s for 6 stream option),* and should not be changed unless the PLC timers have also been changed.

The FILL SEQUENCE TIME in seconds can be found by pressing the [+] key on the PLC while in Standby Mode. This will automatically adjust if times are changed from default settings to show the new FILL SEQUENCE TIME.

Time for the sample pump forward.
If the Venturi Sampler is positioned close to the BioTector, then the BioTectors sample pump will require around 40-50 seconds to transport the sample into the BioTector.

Time for the sample pump reverse.
The time for the sample pump reverse should be long enough to empty the BioTectors sample line of sample and reverse wash cleaning fluid back into the sampler, typically this will be 50-60 seconds.

Time for the empty command.
The empty command is a 5 second pulse which is automatically generated when the sample pump reverse stops.

13. Software Version.

The revision of software version loaded on the PLC can be found by viewing Block B232.

Block No.	Block Description	Default Value
B232	Software Version	xxxx

The first two digits are the Major Revision and the remaining two digits are the minor Revision. For example 0503 = V5.03

14. Programming the Venturi Samplers PLC.

Generally, no changes should be required, as the default fill time is sufficient for most applications.

To change the timers in the PLC:

1. Press the ESC and OK buttons on the PLC together.
2. Press OK to select the STOP command.
3. Press OK again to confirm the STOP command.
4. Press the – (down) key to select PARAMETERS. Press OK.
5. The display should show FBD:000, with the cursor is blinking on all the last three characters.
6. If FBD:000 is not selected, Press OK, and the three numbers will blink.
7. Select for example FBD:155 with the – and + keys, and press OK.
8. Press the – key to select the required time setting.
9. Press OK, and the numbers will blink.
10. With the – and + keys, select the time required for your application.
11. Press OK, and the cursor will blink on your setting.
12. Press ESC, and the cursor will blink on RUN.
13. Press the OK button twice, and then the ESC button to return to the M3 Vacuum Sampler Standby screen.

15. To save modified program settings to the Memory Card.

When the modification has been validated, the modified program must be stored to the Memory Cartridge. Proceed as follows:

1. Press the ESC and OK buttons on the PLC together.
2. Press OK to select the STOP command.
3. Press OK again to confirm the STOP command.
4. Press the – (down) key to select MEMORY CARD. Press OK.
5. Select SAVE. Press OK.
6. Press OK again to confirm the SAVE command. Wait a few seconds while the SAVE sequence runs.
7. Press OK, and the cursor will blink on RUN.
8. Press the OK button twice, and then the ESC button to return to the Venturi Driven Vacuum Sampler Standby screen.

16. To restore original program settings from the Memory Card or to upgrade Firmware.

If any modification you made to the program causes the sampler PLC to fail, the original program can be downloaded from its Memory Cartridge. Proceed as follows:

1. Press the ESC and OK buttons on the PLC together.
2. Press OK to select the STOP command.
3. Press OK again to confirm the STOP command.
4. Press the – (down) key to select MEMORY CARD. Press OK.
5. Press the – key to select RESTORE. Press OK.
6. Press OK again to confirm the RESTORE command. Wait a few seconds while the RESTORE sequence runs.
7. Press OK, and the cursor will blink on RUN.
8. Press the OK button twice, and then the ESC button to return to the Venturi Driven Vacuum Sampler Standby screen.

17. Six Month Maintenance on the Venturi Driven Vacuum Sampler.

Confirm that the chamber is clean.	_____
Confirm that the Venturi pump is clean, and there is no build-up of lime-scale or other material inside the Venturi pump. Clean the Venturi pump with appropriate cleaning agent if necessary.	_____
Confirm that the air supply for the valves and air supply for the purge is at the correct pressure. See section 3 for details.	_____
Confirm that the water pressure and temperature for the purge is at the correct pressure. See section 3 for details.	_____
Confirm that the chamber is filling correctly.	_____
Confirm that the chamber is purging correctly.	_____
Confirm that the membrane valves are not leaking.	_____
Confirm that the valve isolating the Sampler from the BioTector is not leaking.	_____
Confirm the Venturi is detecting sample correctly.	_____

18. Pressure ratings on the Venturi Driven Vacuum Sampler.

The sampler has a working pressure of 6 bar.
The pressure ratings and / or test pressure of the individual items in the sampler are given below.

Item	Pressure rating	Data sheet or test certificate attached
Pressure Chamber, first chamber. Manufacturer Adtech / Scantube. Material, PFA, ½" OD x 3/8" ID	23 bar working pressure	Data sheet
Pressure Chamber, second chamber. Manufacturer Adtech / Scantube. Material, PFA, 3/4" OD x 5/8" ID	16 bar working pressure	Data sheet
Air Purge valve. Manufacturer Burkert. Type 6013, 134233	12 bar	Data sheet
Venturi Air valve. Manufacturer Burkert. Type 6013, 134233	12 bar	Data sheet
Water Purge valve. Manufacturer Burkert. Type 6013, 134233	12 bar	Data sheet
Inlet valve. Manufacture Burkert. Type 2031, threads G1/4", SS 1.4404 body, EPDM diaphragm.	10 bar.	Data Sheet
BioTector sample valve. Manufacture Burkert. Type 2031, threads G1/4", SS 1.4404 body, EPDM diaphragm.	10 bar.	Data Sheet
Venturi valve. Manufacture Burkert. Type 2031, threads G1/4", SS 1.4404 body, EPDM diaphragm.	10 bar.	Data Sheet
The items listed below, while part of the overall sampler and not in direct contact with the pressure sampler media, they are only in contact with the instrument air supply.		
Air solenoid valve. Manufacturer Norgern. Type M/49	10 bar. Note, connected to instrument air supply only, not directly to the sampler.	Data Sheet.
Pressure regulator. Manufacture Norgren. Type R07-200-RNKG	20 bar. Note, connected to instrument air supply only, not directly to the sampler.	Data Sheet
Pressure switch. Manufacturer Norgren. Type 0880300, 0.5-8 bar.	30 bar	Data Sheet

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19. Test Certificate

Test Certificate

Item: **Venturi Sampler**

Manufacturer: **BioTector Analytical Systems Ltd.**

Address: Raffeen House,
Ringaskiddy,
Co. Cork,
Ireland.

Design Pressure: 10 bar.
Working Pressure: 6 bar.

20. Venturi Sampler Commissioning and Start-up

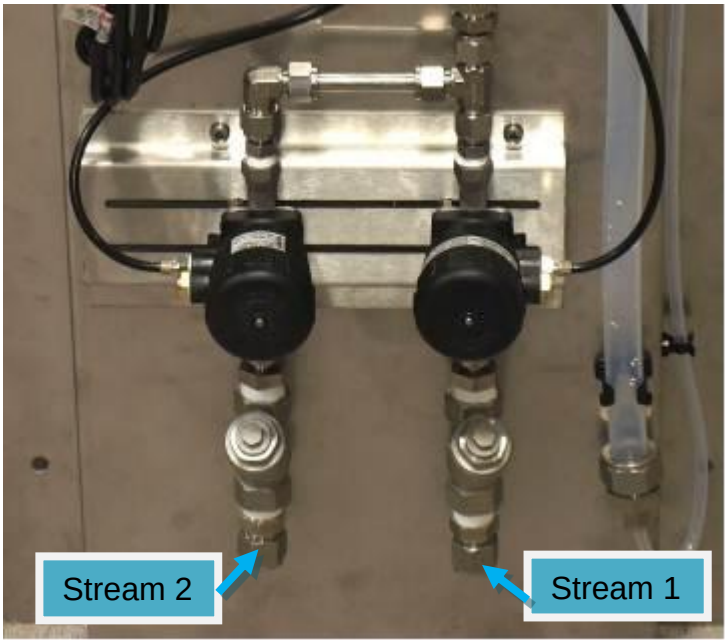
The check list below must be used to ensure that the installation has been properly carried out. Please proceed through the check list in the given order.

The check list refers to the standard Venturi sampler.

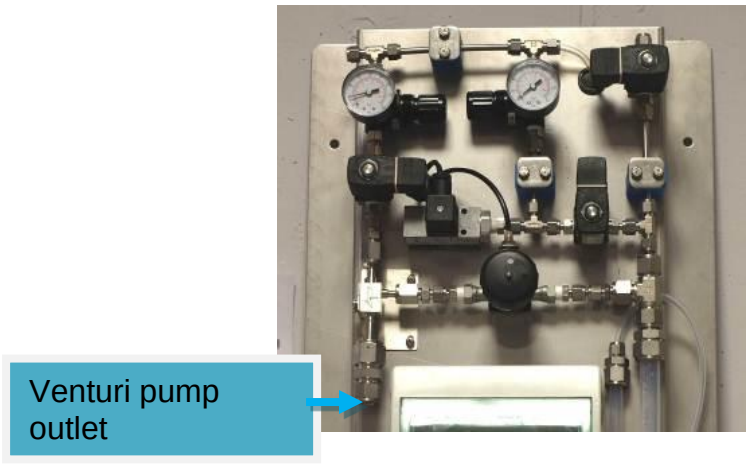
Bolt the Venturi Sampler to a wall ideally within 1 meter of the BioTectors sample in port. Venturi sampler cannot be exposed to the direct sunlight and needs to be protected from rain. _____

Connect the Venturi Sampler to earth (ground). _____

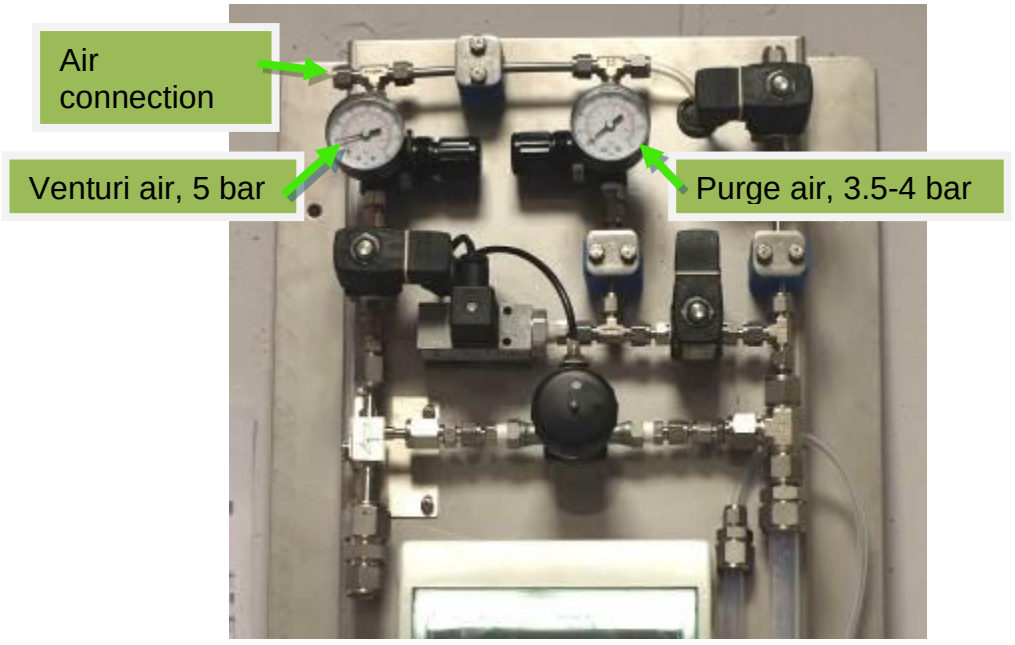
Connect the sample tube from the sample point to the Venturi Sampler using the supplied ½" OD tube. It is important that this tube is installed so that it falls gradually to the sample point. The tube should have no sharp bends, and should not rise above the level of the bottom of the Venturi Sampler at any point.
The sample point should be installed using the typical sample point installation drawing (as attached to the last page of this document) for guidance, or if supplied a site specific installation drawing.
The photograph below shows the sample inlet connections on a typical 2-stream venturi sampler. _____



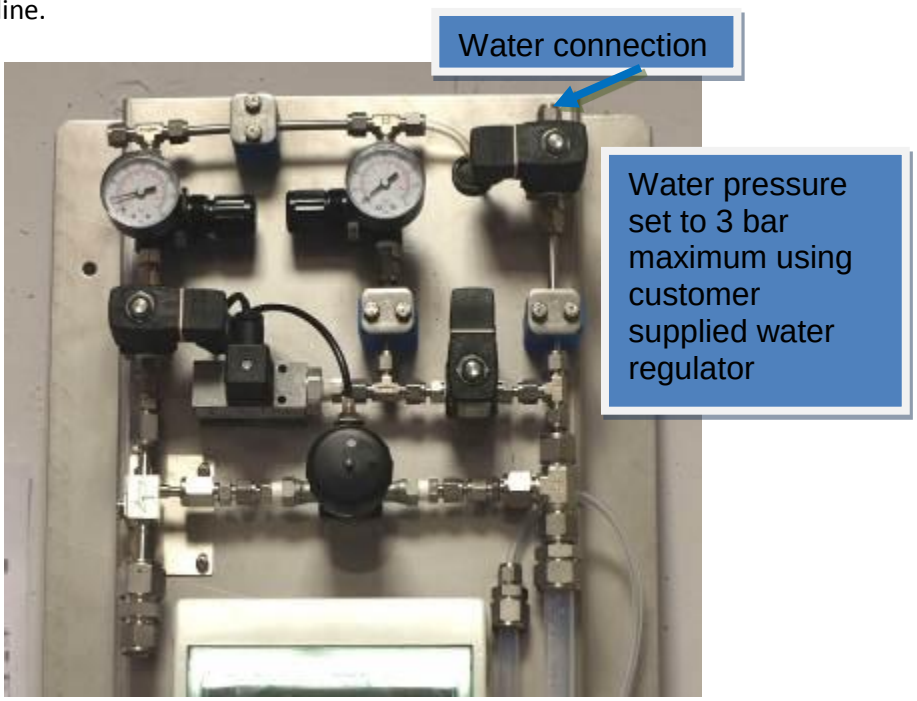
Connect the outlet from the Venturi pump to a pressure free drain using ½" OD PFA tube or similar. CAUTION: This should be outside any enclosure or house, as the liquid discharged to this drain in abnormal conditions can result in the discharge of the customers sample to this drain which could potentially be hot and corrosive.



Connect the air supply to the Venturi Sampler. The typical connection is ¼" Swagelok.
The air for the venturi pump is typically set to 5 bar. It has been found that 5 bar is the optimum pressure for generating the best vacuum in the venturi sampler. Using a higher pressure will not generate a higher vacuum.
The air for the purge is typically set to 3.5 – 4 bar. This pressure must always be greater than the water pressure. If it is lower than the water pressure, then water can feed into the air line.

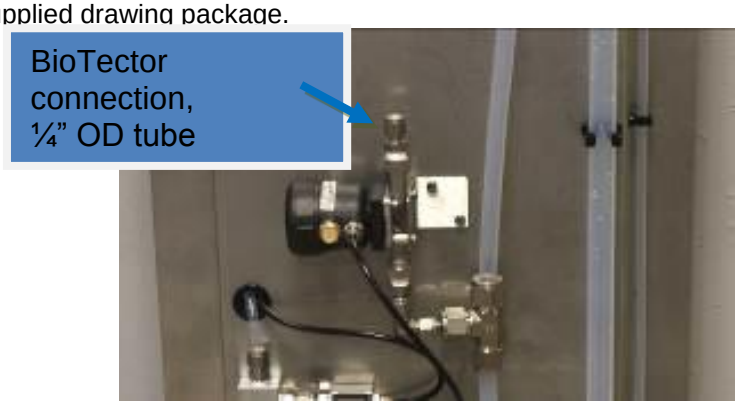


Connect the water supply to the Venturi Sampler. The connection is ¼" Swagelok.
The water pressure is typically set to a maximum of 3 bar. The pressure must always be lower than the purge air pressure. If it is higher than the purge air pressure, then water can feed into the air line.



In cases where there is sticky or fatty material in the sample, it may be necessary to use hot water to backwash the venturi sampler.

Connect the sample tube (or tubes) from the Venturi Sampler to the BioTector in accordance with the supplied drawing package.



If a particulate separation chamber "External Chamber" option is supplied, install the chamber at the sampling point.

Electrically connect the Venturi Sampler to the BioTector with the supplied cable, in accordance with the supplied drawing package.

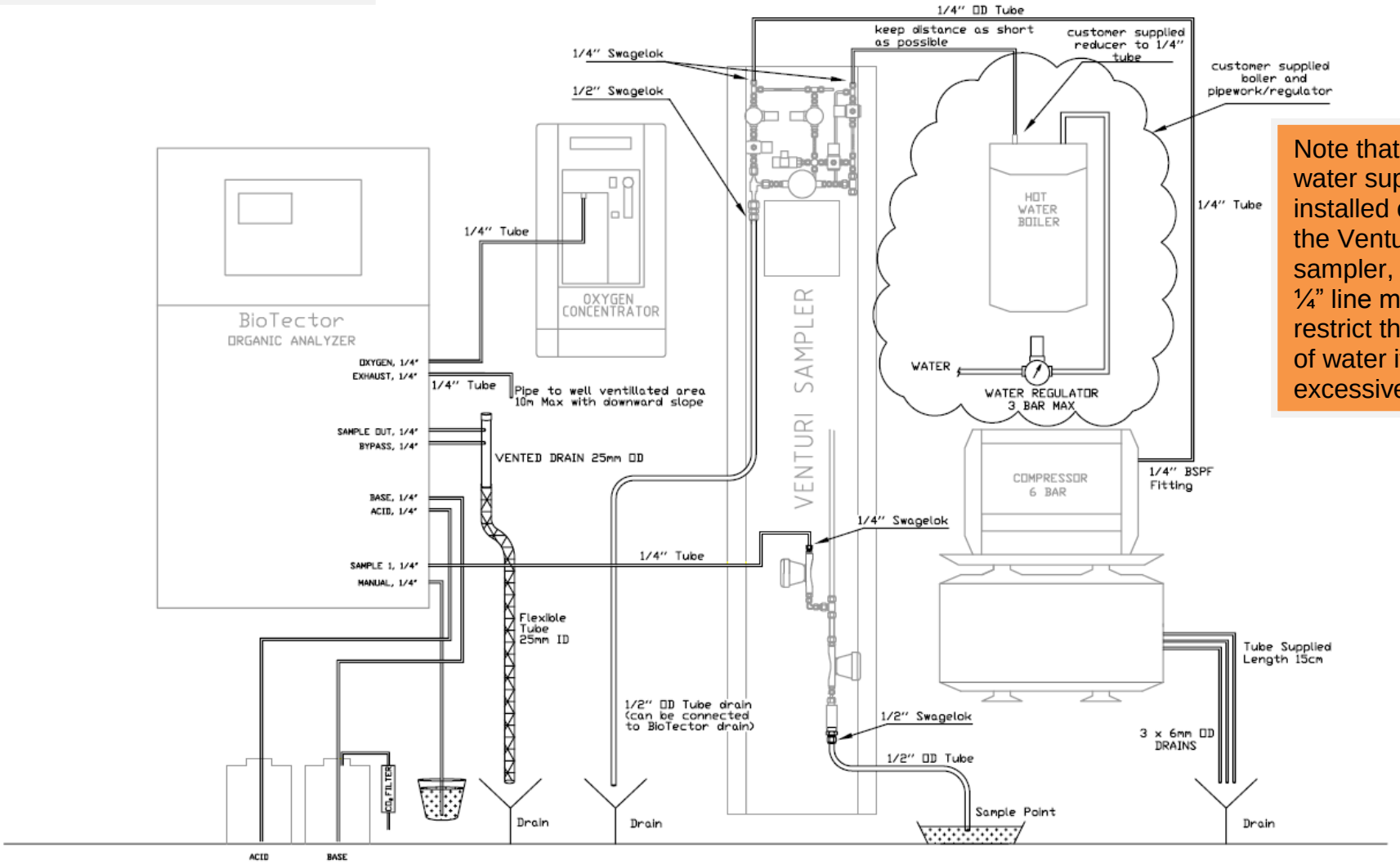
Check the electrical connections and confirm there are no loose connections within the Venturi Sampler.

Check the Swagelok / PFA tube connections and confirm there are no loose connections within the Venturi Sampler.

Power up the Venturi Sampler from the BioTector.	_____
Confirm that the BioTector is programmed for the Venturi Sample, the SAMPLER setting should be YES in the Maintenance / Commissioning / Stream Program menu.	_____
Confirm that the Venturi Sampler **Fill Timer Blocks** are suitable for your application. See section 10 in Venturi Sampler user manual for details. The Venturi Sampler fill sequence can be simulated by using the [A] key on the PLC.	_____
Confirm that the Venturi Sampler **Empty Timer Blocks** are suitable for your application. See section 12 in the Venturi Sampler manual for details. The Venturi Sampler empty sequence can be simulated by using the [B] key on the PLC.	_____
Confirm that the SAMPLER fill time in the BioTector is set. The FILL SEQUENCE TIME of the Venturi Sampler in seconds can be found by pressing the [+] key on the PLC while in Standby Mode. This is the minimum time that can be programmed as the SAMPLER fill time in the BioTector, typically 50% excess of this time is programmed as the SAMPLER fill time in the BioTector.	_____
When the BioTector is running on-line, carefully observe the first two or three reactions and confirm that the Venturi Sampler fills and there is typically 50% excess time programmed for the fill sequence.	_____

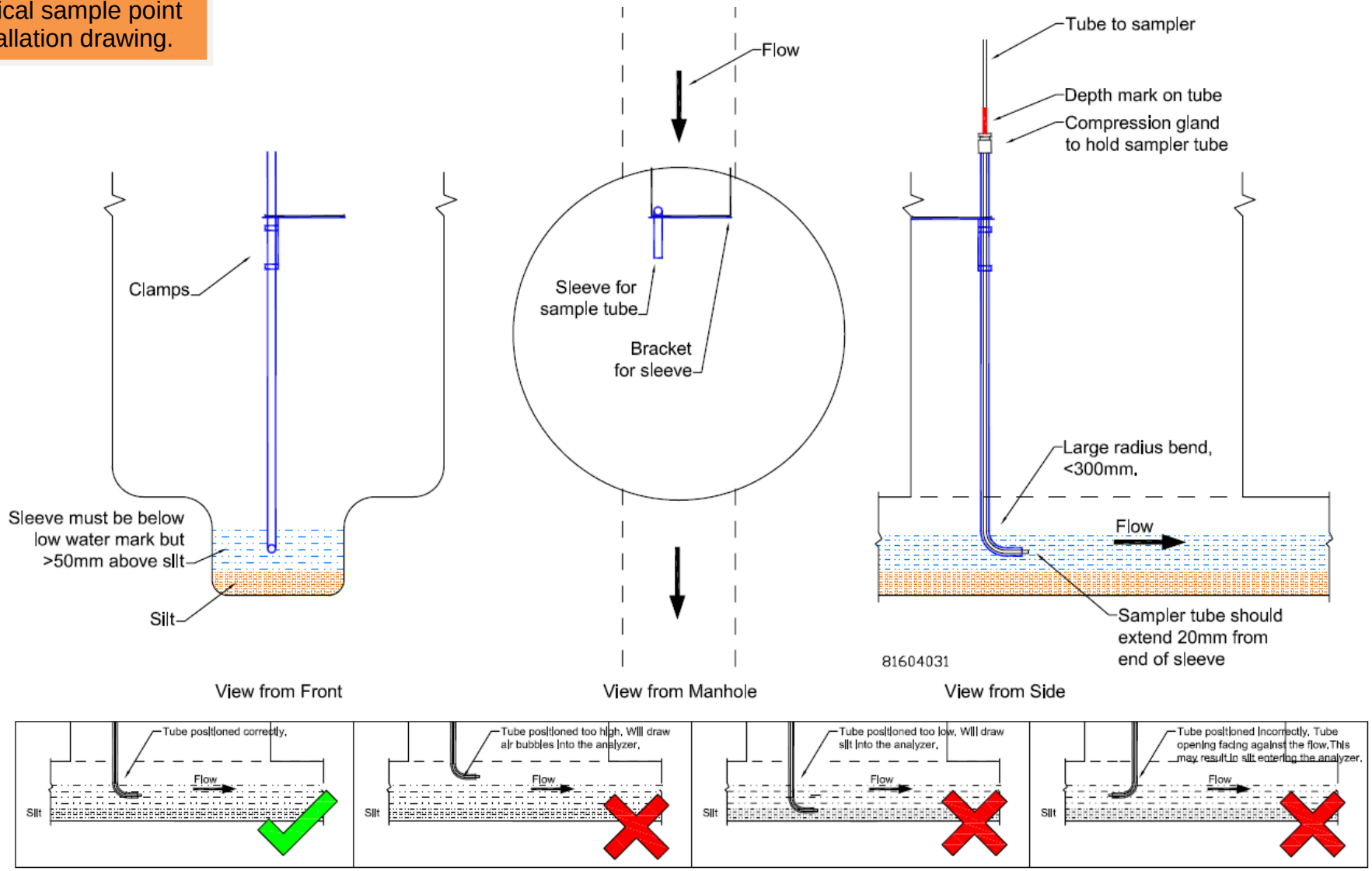
Signed, Engineer		Date	
Signed, Customer		Date	

Typical installation drawing for standard venturi



Note that the water supply is installed close to the Venturi sampler, as the ¼" line may restrict the flow of water if it is excessively long.

Typical sample point installation drawing.



This document contains information which is only required for the export of this instrument into the People's Republic of China.

本手册只包含出口到中华人民共和国的仪器的必要信息。

Statement on China "Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products", Ministry of Information Industry Order #39. (China RoHS2)

中国信息产业部39号指令"限制在电子电气产品中使用有害物质管理办法"的声明 (**China RoHS2)**

Toxic or Hazardous Substances and Elements controlled by China RoHS:
中国电子电气产品中使用有害物质指令限制的有毒有害物质：

铅 - Pb - Lead,

汞 - Hg - Mercury

镉 - Cd – Cadmium

六价铬 - Cr+6 - Hexavalent Chromium

多溴联苯 - PBB - Polybrominated Biphenyl

多溴二苯醚 - PBDE - Polybrominated Diphenylether

(Ref: Chinese Ministry of Information Industry Order #39)
(参考：中国信息产业部第39号指令)

We declare this product does not contain any of the six restricted substances above the allowable limits. The product manufacturing date can be found on the product type label.
特此声明此产品中以上六种受限物质的含量并未超过限制。产品生产日期注明于产品类型标签中。